

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COLFERATION TREATY (PCT)

(19) World Intellectual Property **Organization**

International Bureau



(43) International Publication Date 26 February 2004 (26.02.2004)

PCT

(10) International Publication Number WO 2004/017134 A1

(51) International Patent Classification⁷: G09G 3/19

G02F 1/15,

(21) International Application Number:

PCT/IB2003/003030

(22) International Filing Date:

1 July 2003 (01.07.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 02078378.3

15 August 2002 (15.08.2002) EP

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2004/017134

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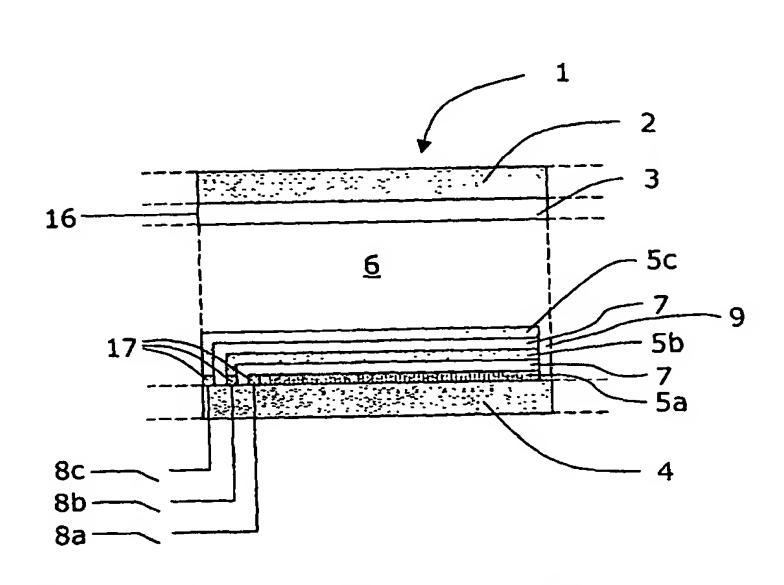
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, F1, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG,

[Continued on next page]

FULL-COLOR ELECTROCHROMIC DISPLAY WITH STACKED IN CELL MONOCHROMIC ELEC-(54) Title: **TROCHROMES**



(57) Abstract: display device comprising a plurality of independently addressable pixels (1) comprising: first substrate (2); a counter-electrode (3); a second substrate (4); a stack of electrochromic layers (5a, 5b, 5c) associated with said second substrate (4); an electrolyte (6) disposed between said counter-electrode (3) and said stack of electrochromic layers (5a, 5b, 5c). Said electrochromic layers (5a, 5b, 5c) are each independently addressable for switching operation; and separated from each other by layers of an electrolyte (7). A driving method for operating said pixel (1) comprises the steps of: providing at least one power line (8) which is selectively connectable to an electrochromic layer (5) or a working electrode (10) associated with said electrochromic layer (5); selectively applying to said power line

(8) a bleaching or coloring voltage; addressing the electrochromic layer (5) which is to be bleached or colored; connecting said power line (8) to said addressed electrochromic layer (5); retaining the connection of said power line (8) during a hold period; and disconnecting said power line (8).

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ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

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Published:

— with international search report

INTERNATIONAL SEARCH REPORT

PCT 03/03030

A.	CLA	SSIFICA	MOITA	OF SUB	JECT (MATTER	
IF	C	7 (302F	1/15	-	GO9G	3/19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) IPC 7 G02F G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC, IBM-TDB, COMPENDEX

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to daim No.
A	US 5 847 860 A (LOWE ANTHONY CYRIL ET AL) 8 December 1998 (1998-12-08) column 1, line 40 -column 1, line 48; figures 2-11 column 4, line 30 -column 7, line 28	1-8
A	US 4 749 260 A (DURAND JR RICHARD R ET AL) 7 June 1988 (1988-06-07) cited in the application column 6, line 3 -column 8, line 24; figures 1-3	1-7
A	EP 0 950 568 A (MURAKAMI KAIMEIDO KK) 20 October 1999 (1999-10-20) paragraph '0017! - paragraph '0044!; figures 3,4	1-7

Further documents are listed in the continuation of box C.	γ Patent family members are listed in annex.
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Date of the actual completion of the international search 24 October 2003	Date of mailing of the international search report 05/11/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nt, Fax: (+31-70) 340-3016	Authorized officer Kiernan, L

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	INTERNATION OF THE SEARCH STATE OF THE SEARCH	PCT/3/03030
C.(Continue	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 006, no. 245 (P-159), 3 December 1982 (1982-12-03) -& JP 57 142617 A (FUJITSU KK), 3 September 1982 (1982-09-03) abstract	1-7

INTERNATIONAL SEARCH REPORT

PCT/ 3/03030

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5847860	Α	08-12-1998	NONE			
US 4749260	A	07-06-1988	US	4586792	Α	06-05-1986
	• •		US	4842383	Α	27-06-1989
•			US	5253100	Α	12-10-1993
EP 0950568	A	20-10-1999	JP	2000002895	A	07-01-2000
			DE	69905960	D1	24-04-2003
			EP	0950568	A1	20-10-1999
			US	6061168	Α	09-05-2000
JP 57142617	A	03-09-1982	NONE			